CLAIMS

What Is Claimed Is

1. A method for fabricating a vacuum package comprising:

arranging a bottom cover wafer under a center wafer, the bottom cover wafer including one or more bond pads to receive one or more getters, the center wafer including one or more vias substantially aligned and corresponding to the one or more bond pads;

inserting one or more getters into the one or more vias;

arranging a top cover wafer opposite the bottom cover wafer to sandwich the center wafer in between, the bottom cover wafer, the center wafer, and the top cover wafer forming a wafer stack assembly;

heating the wafer stack assembly in a vacuum to a temperature sufficient to re-flow solder on the one or more bond pads;

cooling the wafer stack assembly to solidify the solder and secure the one or more getters to their corresponding bond pads;

heating the getters to an activation temperature that is less than the solder re-flow temperature; and

bonding the bottom cover wafer, center wafer, and top cover wafer together in a vacuum to form bonds between the bonded surfaces.

2. The method of claim 1 further comprising:

aligning the bottom cover wafer and the center wafer prior to inserting the one or more getters into the one or more vias.

3. The method of claim 1 further comprising:

aligning the bottom cover wafer and a top cover wafer after inserting the one or more getters into the one or more vias.

4. The method of claim 1 further comprising:

bonding the bottom cover wafer to the center wafer prior to inserting the one or more getters into the one or more vias.

5. The method of claim 1 further comprising:

placing the wafer stack assembly in a vacuum chamber for bonding and getter activation.

6. The method of claim 5 further comprising:

purging the vacuum chamber of air and contaminants prior to heating the wafer stack assembly in a vacuum to a temperature sufficient to re-flow solder on the one or more bond pads.

7. The method of claim 5 further comprising:

purging the vacuum chamber of air and contaminants prior to heating the getters to an activation temperature that is less than the solder re-flow temperature.

8. The method of claim 5 further comprising:

inserting a non-gettable gas into the vacuum chamber prior to heating the getters to an activation temperature that is less than the solder re-flow temperature.

9. The method of claim 5 further comprising:

pumping the vacuum chamber to achieve a desired vacuum level after the getters are heated to an activation temperature that is less than the solder re-flow temperature.

10. The method of claim 1 further comprising:

cooling the wafer stack assembly after the getters are heated to an activation temperature that is less than the solder re-flow temperature.

11. The method of claim 1 further comprising:

annealing the wafer stack assembly to a desired anneal temperature to fully form covalent bonds between the bonded surfaces.

12. A method for fabricating a gyroscope microdevice chip comprising:

aligning a bottom cover silicon wafer and a center silicon wafer, the bottom cover silicon wafer including one or more bond pads to receive one or more getters, the center silicon wafer including one or more vias aligned and corresponding to the one or more bond pads, the center silicon wafer also including a gyroscopic device;

inserting one or more getters into the one or more vias;

aligning the bottom cover silicon wafer and a top cover silicon wafer, the bottom cover silicon wafer, center silicon wafer, and top cover silicon wafer forming a wafer stack assembly;

heating the wafer stack assembly in a vacuum to a temperature sufficient to re-flow solder on the one or more bond pads; and

heating the getters to an activation temperature that is less than the solder re-flow temperature.

13. The method of claim 12 further comprising:

placing the wafer stack assembly in a vacuum chamber for bonding and getter activation;

purging the vacuum chamber of air and contaminants prior to heating the wafer stack assembly in a vacuum to a temperature sufficient to re-flow solder on the one or more bond pads;

purging the vacuum chamber of air and contaminants prior to heating the getters to the activation temperature that is less than the solder re-flow temperature;

cooling the wafer stack assembly after the getters are heated to the activation temperature that is less than the solder re-flow temperature; and

pumping the vacuum chamber to achieve a desired vacuum level after the getters are heated to the activation temperature that is less than the solder re-flow temperature.

14. The method of claim 13 further comprising:

inserting a non-gettable gas into the vacuum chamber prior to heating the getters to an activation temperature that is less than the solder re-flow temperature.

15. The method of claim 13 further comprising:

bonding the bottom cover wafer, center wafer, and top cover wafer together in a vacuum to form bonds between the bonded surfaces; and

annealing the wafer stack assembly to a desired anneal temperature to fully form covalent bonds between the bonded surfaces.

16. A vacuum microdevice package comprising:

a first cover, the first cover having a first surface including a recessed portion with one or more bond pads;

a second dielectric cover, the second dielectric cover aligned with the first dielectric cover;

a center layer sealed between the first surface of the first dielectric cover and the second dielectric cover, the center layer including a microelectronic device and one or more vias aligned with the bond pads on the recessed portion of the first dielectric cover; and

one or more getters deposited through the vias in the center layer and coupled to the one or more bond pads on the first surface of the first dielectric cover to maintain a constant vacuum level within the sealed microdevice package.

17. The package of claim 16 wherein the bond pads on the first surface of the one or more getters are symmetrically distributed on the microelectronic device.

18. The package of claim 16 wherein the first dielectric cover, second dielectric cover and center layer are sealed with a bond.

19. The package of claim 16 wherein the microelectronic device includes a gyroscope.